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(54) Emulator attachable to an ink tank for printing apparatus

(57) An emulator (200) is provided for an ink tank (100). The emulator duplicates one or more of the ink tank features, which are sensed by a print engine to permit proper operation of the print engine. The emulator (200) is an element designed to be attached to an ink tank (100) which lacks one or more of the aforementioned ink tank features which are sensed by the print

engine to ensure proper operation of the print engine. The emulator may attach to an ink tank (100) which is placed into an ink tank receptacle (400) or may fit by itself into the ink tank receptacle. The emulator will permit ink tanks to be used in print engines without the need to provide the one or more sensed features for each ink tank.

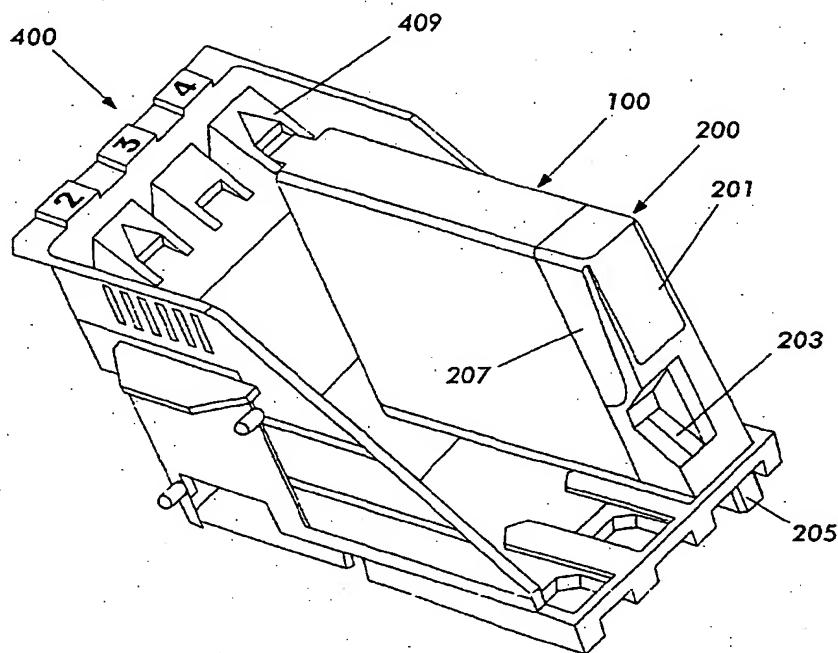


FIG. 3

**Description****BACKGROUND OF THE INVENTION****1. Field of Invention**

[0001] The invention is directed to ink containers for print engines.

**2. Description of Related Art**

[0002] Ink containers or tanks are used in print engines such as, for example ink jet printers. Typically, ink tanks for ink jet printers or plotters have specific shapes. These ink tanks or cartridges are typically designed to fit only in specific printers or plotters. Usually, different brand ink tanks are designed to fit only in one brand of printer or plotter, and will not fit in other brand printers or plotters. Even within a given brand of print engines, such as, for example, printers and plotters, not all ink tanks or cartridges will fit into all of the printers or plotters of that brand. Many printers and plotters use ink tanks or cartridges which are replaceable by a user.

[0003] Some of these printers and plotters have mechanisms to sense whether or not a correct ink tank or cartridge is being inserted into the printer or plotter. If a user attempts to insert an incorrect ink tank or cartridge into a printer or plotter, the printer or plotter will reject it, at least in the sense that, even if the ink tank or cartridge fits into the printer or plotter, the printer or plotter may not operate unless and until it senses that a correct cartridge which it is designed to use has been inserted. Additionally, some ink tanks or cartridges will not fit properly into a particular printer or plotter, and the printer or plotter will not work unless the proper ink tank or cartridge fits properly into the printer or plotter.

**SUMMARY OF THE INVENTION**

[0004] This invention provides a method of emulating ink tank features which are sensed by a print engine.

[0005] This invention separately provides emulation elements which may be provided for a print engine and are positionable such that one or more print engine sensors detect the emulation elements as if the emulation elements were part of an ink tank usable in the print engine.

[0006] In various exemplary embodiments of the systems and methods according to this invention, specific emulation elements can be attached to an ink tank or cartridge. The ink tank or cartridge having an attached emulation element can then be properly inserted into the printer or plotter to act as an appropriate ink tank. As a result, the printer or plotter's ink tank evaluation mechanism, which is responsive to the one or more print engine sensors, treats an ink tank and the emulation elements as if that ink tank were an appropriate ink tank or cartridge designed for proper use in the print engine.

[0007] In various exemplary embodiments of the systems and methods according to this invention, an ink tank which does not have the appropriate features is provided with one or more emulation elements so that the ink tank can be used in a particular printer or plotter. The emulation element according to this invention permits a wide variety of ink tanks to be used with a printer or plotter that is designed not to operate unless and until it senses that an appropriate ink tank or cartridge has been properly inserted into the printer or plotter. The emulation element according to this invention permits modifications of ink tank geometry and ink tank supported functions without being limited to existing constraints on ink tank sensing.

[0008] Various exemplary embodiments of the ink tank usable with the systems and methods according to this invention include, but are not limited to, single ink tanks or cartridges containing multiple different colors in multiple separated containers within the same ink tank or cartridge. The multiple colors can be primary colors, highlight colors, dilute colors, e.g., for photoreal marking, or any other known or later-developed colored ink. Other exemplary embodiments of the ink tanks usable with the systems and methods according to this invention include large capacity ink tanks or cartridges usable within print heads normally designed for multiple ink tanks, and the use of custom single colors as specified by users.

[0009] Other exemplary embodiments of the system and methods according to this invention permit different brand ink tanks to be used in another brand of print engine.

[0010] These and other features and advantages of this invention are described in, or are apparent from, the following detailed description of various exemplary embodiments of the systems and methods according to this invention.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0011] Various exemplary embodiments of this invention will be described in detail, with reference to the following figures, wherein:

45 Fig. 1 is a perspective view of a conventional ink tank having sensible features which are sensed by a print engine;

50 Fig. 2 is a perspective view of an ink tank which lacks the sensible features of the ink tank of Fig. 1 and one exemplary embodiment of an emulation device according to the invention;

55 Fig. 3 is a perspective view of an ink tank and an emulation device according to this invention, located within an ink tank receptacle in a print engine designed to sense sensible features provided by the emulation device;

Fig. 4 is a perspective view of one exemplary embodiment of an emulation device according to this

invention being inserted into an ink tank receptacle in a print engine designed to sense sensible features provided by the emulation device;

Fig. 5 is a front view of one exemplary embodiment of an emulation device according to the invention; Fig. 6 is a perspective view of one exemplary embodiment of an emulation device according to the invention.

#### DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0012] Fig. 1 shows an ink tank 300 which is designed to fit into a specific ink tank receptacle of a print head (not shown). The ink tank 300 has a toe 305 which is designed to fit into a slot in this specific ink tank receptacle of a print head (not shown), an identification element 301, which is designed to be detected by a sensing device in the print engine containing the specific ink tank receptacle, and, optionally, an ink level viewing and/or indication element 303. Ink tank 300 has a tapered portion 309 which mates with ink tank receptacle latch element 409 (shown in Fig. 3). When inserted into a print engine, such as, for example, an ink jet printer or plotter, the sensing device of the printer or plotter outputs a signal to a controller of the print engine. The signal indicates that the ink tank 300 is an appropriate ink tank for this print engine. As a result, the controller permits the print engine to operate using ink from ink tank 300. If the controller determines, based on the signal from the sensing device that the ink tank 300 is inappropriate for the print engine, the controller will not allow the print engine to operate using that ink tank 300.

[0013] The slot in which the toe 305 fits, as well as any other mating and/or keying structure, is another type of sensor according to the principles of this invention, as an "appropriate" ink tank must have the corresponding mating and/or keying structure. Otherwise, an "inappropriate" ink tank lacking the corresponding mating and/or keying structure will not properly fit into the ink tank receptacle. Thus, the mating and/or keying structure of a receptacle "senses" whether or not the ink tank that the user attempts to install into that receptacle has a corresponding mating and/or keying structure. Similarly, the mating and/or keying structure can, by preventing an "inappropriate" ink tank lacking the corresponding mating and/or keying structure from fully fitting into the ink tank receptacle, ensure that any other sensible structures on that inappropriate ink tank are not placed appropriately relative to other sensors of the ink tank receptacle. As a result, these other sensors will not sense the other sensible structure, thus indicating that the "inappropriate" ink tank is truly inappropriate.

[0014] Fig. 2 shows an ink tank 100 which lacks one or more sensible feature of the ink tank 301. For example, the ink tank 100 does not contain an ink identification element 301 of the ink tank 300. Ink tank 100 has a tapered portion 109 which mates with ink tank recep-

tacle latch element 409 (shown in Fig. 3). The ink tank 100 also does not contain an ink level viewing and/or indication element 303. Nor does the ink tank 100 contain a toe 205 to permit the ink tank 100 to be properly inserted into an ink tank receptacle that is designed for ink tanks having features such as the ink tank 300. Fig. 2 also shows one exemplary embodiment of an emulation element 200 according to the invention. As shown in Fig. 2, in this exemplary embodiment, emulation element 200 includes an ink identification feature 201, an ink level viewing or indication feature 203, a toe feature 205, and a brand identification feature 207. It should be appreciated that the emulation element 200 may contain any one or more of ink identification features 201, ink level viewing or indication features 203, toe features 205, and brand identification features 207, depending on the set of features that, for any given ink tank receptacle and proper operation criteria, an "appropriate" ink tank will have. Thus, for example, if a particular ink tank receptacle is designed to accept a particular brand of ink tank 100 that has a toe 305 and a brand identification feature 302, then an emulation element 200 need only have a particular brand identification feature 207 and a toe feature 205 to render "appropriate" the ink tank 100 that lacks these features. The number and distinctiveness of the features may vary.

[0015] Fig. 3 shows an ink tank 100 which has been provided with the emulation element 200 according to this invention. As shown in Fig. 3, the ink tank 100 and the emulation element 200 is shown properly inserted into an ink tank receptacle 400 which is designed to accommodate the ink tank 300, as shown in Fig. 1, that has the ink identification feature 201, the ink level viewer or indicator feature 203, the toe feature 205 and the brand indicator 207. The emulation element 200 has been attached to the ink tank 100, which otherwise is not designed to appropriately fit into the ink tank receptacle 400. However, because the emulation element 200 has been attached to the ink tank 100, the ink tank 100 with the emulation element 200 interacts with the various features and sensors of the ink tank receptacle 400 and/or the print engine, such that the print engine containing the ink tank receptacle 400 cannot detect that the installed ink tank is an "inappropriate" ink tank 100, not the appropriate ink tank 300.

[0016] The emulation element 200 may be fit or attached to the ink tank 100 using any appropriate or known or later-developed device, structure or material. For example, the emulation element 200 may be attached to ink tank 100 by an adhesive, or by Velcro® elements, magnets, screws, or tape. The emulation element 200 may be attached to ink tank 100 by a slip fit over the ink tank 100, or by a fit, including a snap fit, with male and/or female elements provided on the ink tank 100. Also, the emulation element 200 may be attached to ink tank 100 by any other suitable known or later-developed attachment device, material or mechanism.

[0017] Fig. 4 shows the ink tank receptacle 400 which

is designed to accept an ink tank 100 or 300 with or without an emulation element 200, with an emulation element 207 being inserted into the print head 400. The ink tank receptacle 400 is also designed to accept the emulation element 200 with or without an ink tank 100 or 300. Fig. 4 shows the relative dimensions of the ink tank receptacle 400 and of the emulation element 200, and shows an emulation element 200 inserted into an ink tank receptacle separate and apart from an ink tank 100. By inserting an ink tank emulation element 200 by itself into an ink tank receptacle 400, the ink tank emulation element 200 can be tested, and any desired changes or adjustments to the feature 201, the feature 203, the feature 205 and for the feature 207 can be made. For example, an ink identification indicator 207, such as, for example, a label, can be changed and tested. Of course, such testing can take place while an emulation element 200 is attached to an ink tank 100.

[0018] Figs. 5 and 6 show a front plan view and a bottom perspective view, respectively, of the structural details of three emulation elements 200 in a side-by-side arrangement. These emulation elements 200 may be separate from each other or may be joined together. Each emulation element 200 can contain one or more of a toe portion 205, an ink identification feature 201, an ink level viewer and indicator 203 and an ink tank brand indicator 207. Depending on the ink tank receptacle, only one of each of these features may be desirable, or multiple instances of one or more of these features may be desirable.

[0019] The emulation elements according to this invention allow any ink tank to appear to be the type that is to be appropriately installed into a given ink tank receptacle in a print engine. The emulation elements according to this invention also allow one device, an ink tank with the emulator element, to appear as if that device were another device, such as, for example, an appropriate ink tank designed to be used with a particular ink tank receptacle in a particular print engine.

## Claims

1. An emulator attachable to an ink tank usable in a print engine that senses at least one sensible feature of an installed ink tank, comprising:  
an emulation element, distinct from the ink tank, having at least one of the at least one sensible feature, such that, when the emulation element is attached to the ink tank, the ink tank is rendered usable in the print engine.
2. The emulator of claim 1, further comprising an ink tank combined with the emulator.
3. The emulator of claim 2, further comprising an ink tank receptacle configured to accept the emulator

combined with the ink tank.

4. The emulator of claim 1, further comprising an ink tank receptacle combined with said emulator.
5. The emulator of claim 1, wherein the at least one sensible feature of the emulation element comprises an ink identification element.
- 10 6. The emulator of claim 1, wherein the at least one sensible feature of the emulation element comprises an ink level viewing element.
- 15 7. The emulator of claim 1, wherein the at least one sensible feature of the emulation element comprises an ink level indicator.
8. The emulator of claim 1, wherein the at least one sensible feature of the emulation element comprises at least one mating and/or keying structure.
- 20 9. A method of permitting an ink tank to operate in a print engine that requires an appropriate ink tank to have at least one sensible feature, comprising:

25 associating an emulation element with an ink tank that lacks at least one of the at least one sensible feature, the emulation element including the at least one of the at least one sensible feature lacked by the ink tank; and  
30 installing the ink tank and the associated emulation element in the print engine, such that the print engine senses all of the at least one sensible features required by the print engine.

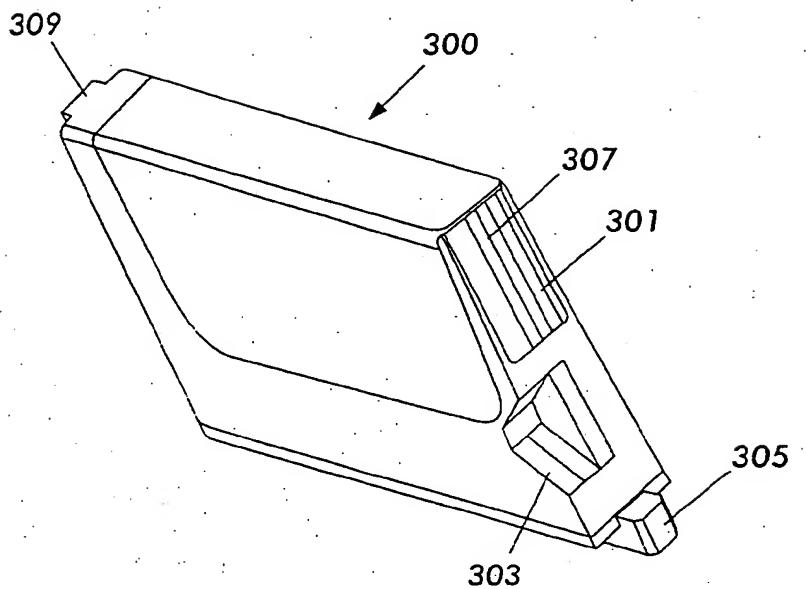
- 35 10. The method of claim 9, further comprising attaching the ink tank and the emulation element to each other.

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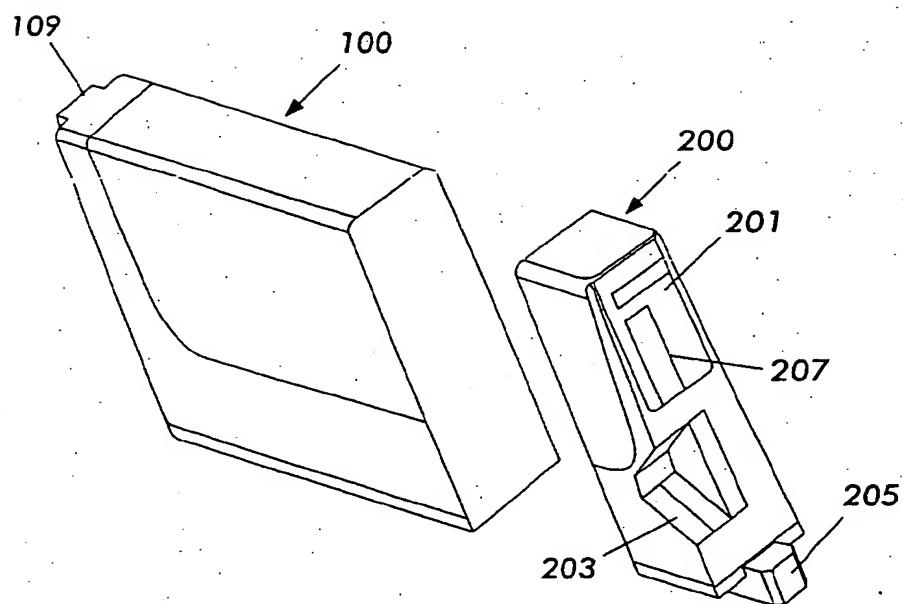
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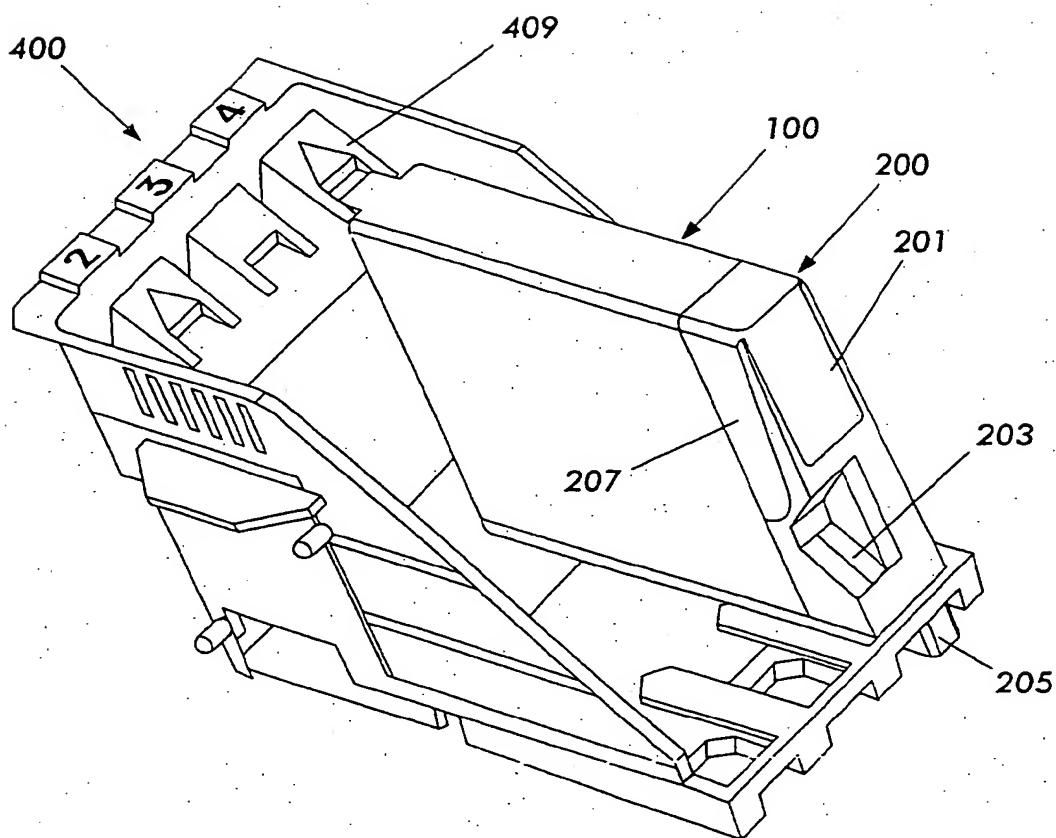
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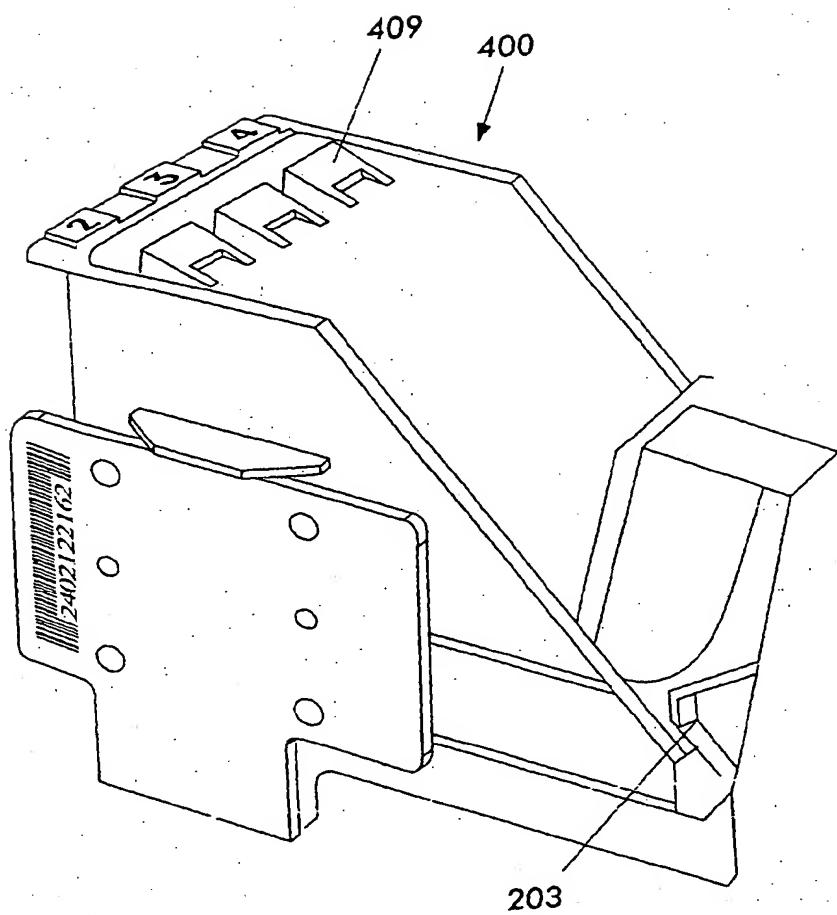
**FIG. 1**



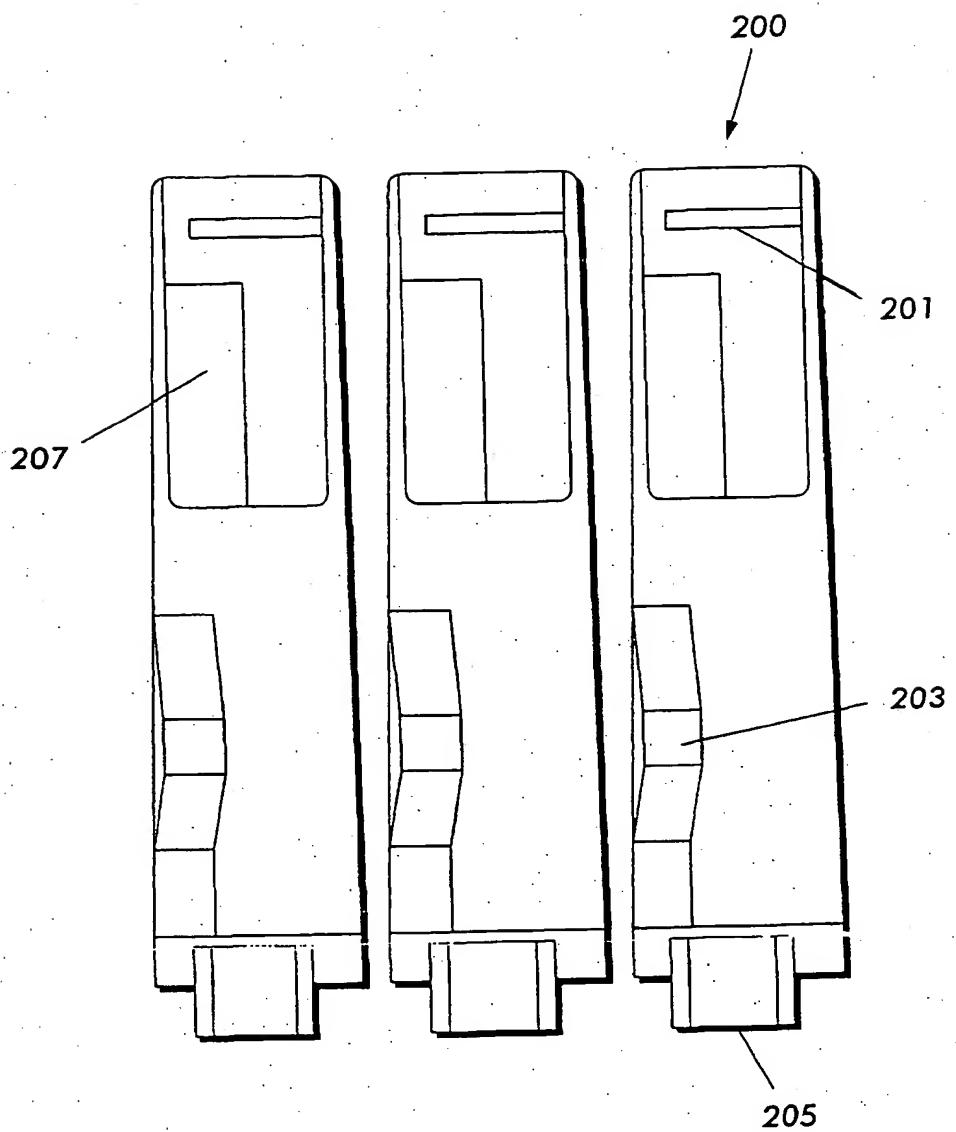
**FIG. 2**



**FIG. 3**



**FIG. 4**



**FIG. 5**

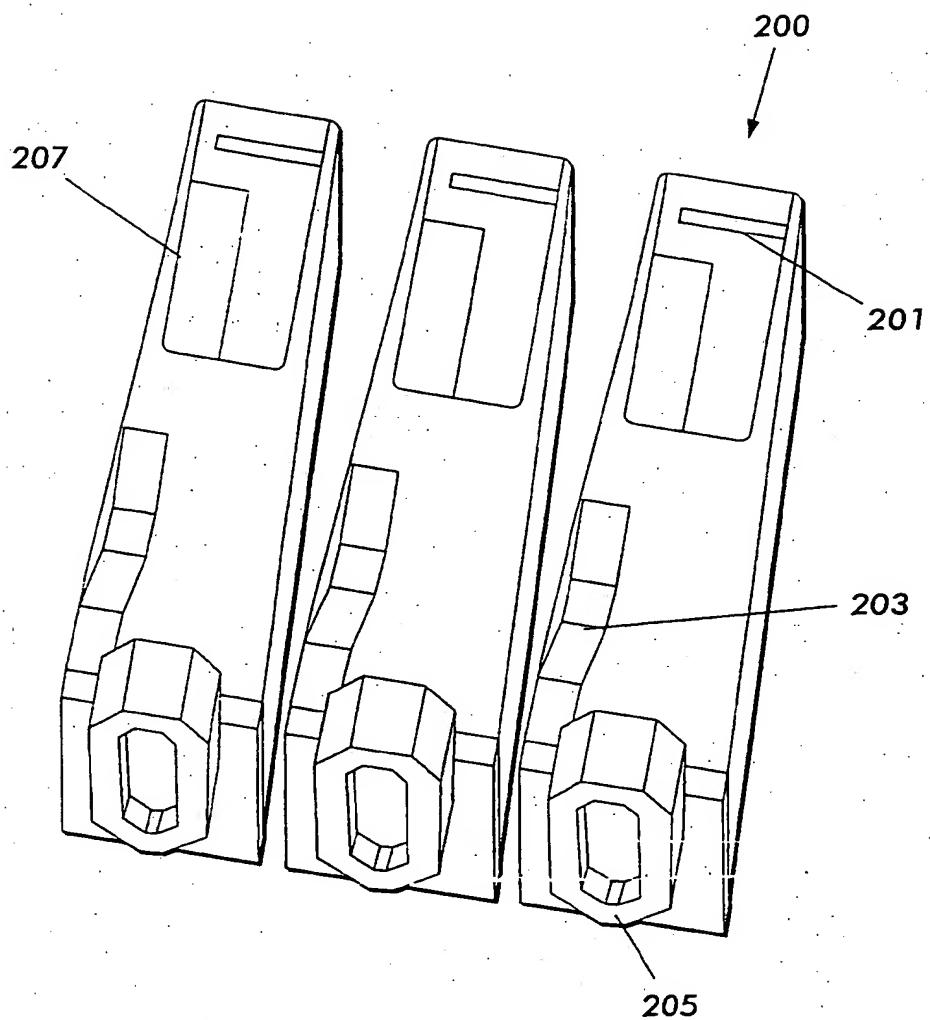


FIG. 6



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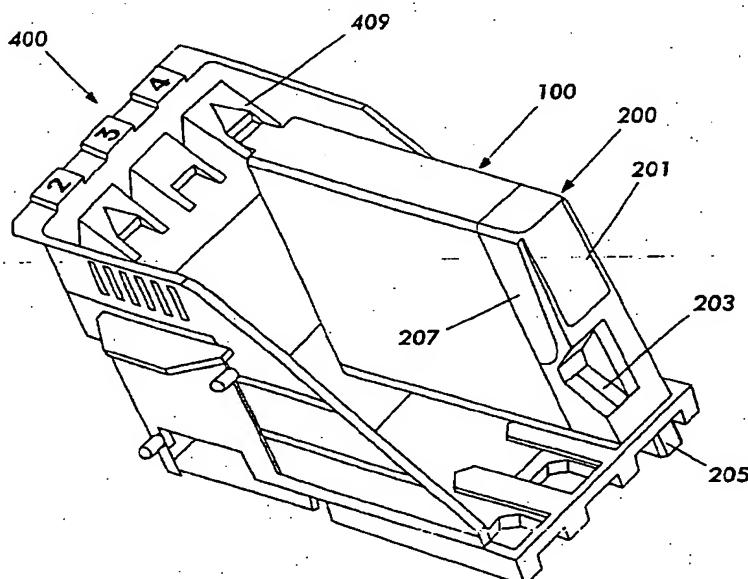


FIG. 3



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## EUROPEAN SEARCH REPORT

Application Number  
EP 01 13 0493

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	US 6 062 667 A (MATSUI SHINYA ET AL) 16 May 2000 (2000-05-16) * abstract * * column 15, line 52 - column 16, line 5; figure 10 * * column 16, line 37 - line 48; figure 11 * ---	1-5,8-10	B41J2/175
X	US 6 142 600 A (KANEMATSU DAIGORO ET AL) 7 November 2000 (2000-11-07) * column 9, line 15 - line 51; figures 6A,6B,7A,7B *	1-5,8-10	
X	EP 0 993 954 A (HEWLETT PACKARD CO) 19 April 2000 (2000-04-19) * column 5, line 47 - column 6, line 7; figure 1A *	1-4,8-10	
X	EP 0 623 471 A (HEWLETT PACKARD CO) 9 November 1994 (1994-11-09) * column 3, line 56 - column 4, line 26; figures 1A,1B *	1-4,8-10	
X	US 4 853 708 A (WALTERS MICHAEL A) 1 August 1989 (1989-08-01) * column 6, line 9 - line 22; figures 7A-7D *	1-4,8-10	B41J
X	FR 2 744 391 A (IMAJE SA) 8 August 1997 (1997-08-08) * page 6, line 10 - line 29; figure 1 * * page 8, line 10 - line 13 *	1-5,9,10	
A	EP 0 903 236 A (HEWLETT PACKARD CO ;OWENS ILLINOIS CLOSURE INC (US)) 24 March 1999 (1999-03-24) * column 8, line 24 - line 55; figures 9-11 *	6,7 1,9 -/-	
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	1 April 2003	Adam, E	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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Office

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EP 01 13 0493

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.CI.7)						
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim							
A	US 6 142 617 A (GAST PAUL DAVID ET AL) 7 November 2000 (2000-11-07) * column 7, line 16 - line 42; figures 6A-6C *	1,9							
A	US 6 151 041 A (HARRINGTON III PAUL ET AL) 21 November 2000 (2000-11-21) * column 2, line 6 - line 26; figure 1 *	1,9							
			TECHNICAL FIELDS SEARCHED (Int.CI.7)						
<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 33%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>1 April 2003</td> <td>Adam, E</td> </tr> </table>				Place of search	Date of completion of the search	Examiner	THE HAGUE	1 April 2003	Adam, E
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<p>CATEGORY OF CITED DOCUMENTS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;">           X: particularly relevant if taken alone            Y: particularly relevant if combined with another document of the same category            A: technological background            O: non-written disclosure            P: intermediate document         </td> <td style="width: 50%; vertical-align: top;">           T: theory or principle underlying the invention            E: earlier patent document, but published on, or after the filing date            D: document cited in the application            L: document cited for other reasons            &amp;: member of the same patent family, corresponding document         </td> </tr> </table>				X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document	T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons &: member of the same patent family, corresponding document				
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ON EUROPEAN PATENT APPLICATION NO.

EP 01 13 0493

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01-04-2003

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6062667	A	16-05-2000	JP 3020963 B2	15-03-2000
			JP 3067657 A	22-03-1991
			JP 2790347 B2	27-08-1998
			JP 3193458 A	23-08-1991
			JP 3193459 A	23-08-1991
			JP 3197052 A	28-08-1991
			JP 3213349 A	18-09-1991
			US 5506611 A	09-04-1996
			US 6312084 B1	06-11-2001
			AT 173677 T	15-12-1998
			AT 187126 T	15-12-1999
			AT 227649 T	15-11-2002
			AT 213999 T	15-03-2002
			AU 648985 B2	12-05-1994
			AU 6024190 A	07-02-1991
			CA 2022756 A1	06-02-1991
			CN 1051011 A , B	01-05-1991
			CN 1141241 A , B	29-01-1997
			DE 9018060 U1	15-09-1994
			DE 69032780 D1	07-01-1999
			DE 69032780 T2	02-06-1999
			DE 69033377 D1	05-01-2000
			DE 69033377 T2	29-06-2000
			DE 69033928 D1	11-04-2002
			DE 69033928 T2	18-07-2002
			DE 69034019 D1	19-12-2002
			EP 1234675 A2	28-08-2002
			EP 0412459 A2	13-02-1991
			EP 0610965 A1	17-08-1994
			EP 0729836 A1	04-09-1996
			EP 0872347 A1	21-10-1998
			EP 0997296 A1	03-05-2000
			ES 2124212 T3	01-02-1999
			HK 1011647 A1	01-09-2000
			HK 1011655 A1	24-03-2000
			KR 9600542 Y1	17-01-1996
			KR 9511532 B1	06-10-1995
			SG 54174 A1	16-11-1998
			SG 74554 A1	22-08-2000
			SG 85110 A1	19-12-2001
US 6142600	A	07-11-2000	JP 10006527 A	13-01-1998
EP 0993954	A	19-04-2000	US 6224192 B1	01-05-2001
			EP 0993954 A2	19-04-2000
			JP 2000141688 A	23-05-2000

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 01 13 0493

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

01-04-2003

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0623471	A	09-11-1994	US 5519422 A DE 69405042 D1 DE 69405042 T2 EP 0623471 A2 HK 1000340 A1 JP 6344628 A	21-05-1996 25-09-1997 26-03-1998 09-11-1994 27-02-1998 20-12-1994
US 4853708	A	01-08-1989	DE 68914978 D1 DE 68914978 T2 EP 0382799 A1 JP 2503410 T JP 2975620 B2 WO 8908028 A1	01-06-1994 11-08-1994 22-08-1990 18-10-1990 10-11-1999 08-09-1989
FR 2744391	A	08-08-1997	FR 2744391 A1 AU 712509 B2 AU 1607197 A CA 2246585 A1 CN 1210490 A ,B DE 69712184 D1 DE 69712184 T2 EP 0877666 A1 ES 2175338 T3 WO 9728001 A1 JP 2000503921 T	08-08-1997 11-11-1999 22-08-1997 07-08-1997 10-03-1999 29-05-2002 12-12-2002 18-11-1998 16-11-2002 07-08-1997 04-04-2000
EP 0903236	A	24-03-1999	US 6068371 A BR 9803942 A CA 2247033 A1 CN 1215664 A EP 0903236 A2 JP 11157095 A SG 72863 A1 TW 404894 B	30-05-2000 21-12-1999 22-03-1999 05-05-1999 24-03-1999 15-06-1999 23-05-2000 11-09-2000
US 6142617	A	07-11-2000	US 5721576 A US 5825387 A CN 1186021 A ,B DE 19735157 A1 EP 0968090 A1 GB 2316657 A ,B JP 2001509103 T WO 9831548 A1 US 2001015738 A1 US 6386692 B1 US 5956057 A	24-02-1998 20-10-1998 01-07-1998 05-03-1998 05-01-2000 04-03-1998 10-07-2001 23-07-1998 23-08-2001 14-05-2002 21-09-1999

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 01 13 0493

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

01-04-2003

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6142617	A		DE 69606271 D1	24-02-2000
			DE 69606271 T2	14-09-2000
			EP 0778144 A1	11-06-1997
			JP 3014333 B2	28-02-2000
			JP 9174873 A	08-07-1997
			CN 1134886 A ,B	06-11-1996
			DE 69507596 D1	11-03-1999
			DE 69507596 T2	17-06-1999
			EP 0739740 A1	30-10-1996
			JP 2766251 B2	18-06-1998
			JP 9150524 A	10-06-1997
			US 2002036680 A1	28-03-2002
			US 6130695 A	10-10-2000
			US 6015209 A	18-01-2000
			US 2001013886 A1	16-08-2001
			US 6137513 A	24-10-2000
			US 6183077 B1	06-02-2001
			US 6322207 B1	27-11-2001
			US 5900896 A	04-05-1999
			US 5734401 A	31-03-1998
			US 5856840 A	05-01-1999
			US 5852459 A	22-12-1998
			US 6033064 A	07-03-2000
			US 6364472 B1	02-04-2002
			US 5854646 A	29-12-1998
			US 6017118 A	25-01-2000
US 6151041	A	21-11-2000	NONE	